ABSTRACT OF THE DISCLOSURE

The air-fuel ratio computing apparatus includes a linear air-fuel ratio sensor for measuring an air-fuel ratio of exhaust gas and an electronic control unit for repeatedly performing filter processing on the air-fuel ratio, using a formula

$$Vf(n) = (1-G) \times Vf(n-1) + G \times V(n).$$

In a case where a temperature of the sensor is low, the unit cuts off a pump current to the sensor, performs the filter processing with the filter gain G set to a large value, and transforms a computed value from the filter processing into a theoretical air-fuel ratio voltage and in a case where the temperature of the sensor rises to or above a predetermined temperature, the unit performs the filter processing with a filter gain G set to a small value, and computes an air-fuel ratio from the difference between a computed value from the filter processing and the theoretical air-fuel ratio voltage.